



# RF EXPOSURE REPORT

**REPORT NO.:** SA961203L09

**MODEL NO.:** MZK-W04NU

**ACCORDING:** FCC Guidelines for Human Exposure  
IEEE C95.1

**APPLICANT:** PLANEX COMMUNICATION INC.

**ADDRESS:** 9F-1, No. 188, Baociao Rd., Sindian City, Taipei  
County 231, TAIWAN

**ISSUED BY:** Advance Data Technology Corporation

**LAB ADDRESS:** 47 14<sup>th</sup> Lin, Chiapau Tsun, Linko, Taipei, Taiwan,  
R.O.C.

**TEST LOCATION:** No. 19, Hwa Ya 2<sup>nd</sup> Rd., Kueishan, Taoyuan,  
Taiwan, R.O.C.



## RF EXPOSURE MEASUREMENT (MOBILE DEVICE)

### 1. INTRODUCTION

In this document, we try to prove the safety of radiation harmfulness to the human body for our product. The limit for Maximum Permissible Exposure (MPE) specified in FCC 1.1310 is followed. The Gain of the antenna used in this product is measured in a Fully Anechoic Chamber (FAC) calibrated for antenna measurement in ADT, and also the maximum total power input to the antenna is measured. Through the Friis transmission formula and the maximum gain of the antenna, we can calculate the distance, away from the product, where the limit of MPE is reached.

Although the Friis transmission formula is a far field assumption, the calculated result of that is an over-prediction for near field power density. We will take that as the worst case to specify the safety range.

### 2. RF EXPOSURE LIMIT

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in 1.1307(b)

#### LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

FREQUENCY RANGE (MHz)	ELECTRIC FIELD STRENGTH (V/m)	MAGNETIC FIELD STRENGTH (A/m)	POWER DENSITY (mW/cm <sup>2</sup> )	AVERAGE TIME (minutes)
<b>(A)LIMITS FOR OCCUPATIONAL / CONTROL EXPOSURES</b>				
300-1500	...	...	F/300	6
1500-100,000	...	...	5	6
<b>(B)LIMITS FOR GENERAL POPULATION / UNCONTROLLED EXPOSURE</b>				
300-1500	...	...	F/1500	30
1500-100,000	...	...	1.0	30

F = Frequency in MHz



### 3. FRIIS FORMULA

Friis transmission formula :  $P_d = (P_{out} * G) / (4 * \pi * r^2)$

where

$P_d$  = power density in mW/cm<sup>2</sup>

$P_{out}$  = output power to antenna in mW

$G$  = gain of antenna in linear scale

$\pi$  = 3.1416

$R$  = distance between observation point and center of the radiator in cm

If we know the maximum Gain of the antenna and the total power input to the antenna, through the calculation, we will know the MPE value at distance  $r$ .

Ref.: David K. Cheng, *Field and Wave Electromagnetics*, Second Edition,

Page 640, Eq. (11-133).

### 4. EUT OPERATING CONDITION

The software provided by Manufacturer enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

### 5. CLASSIFICATION

The antenna of the product, under normal use condition, is at least 20cm away from the body of the user. Warning statement to the user for keeping at least 20cm or more separation distance with the antenna should be included in users manual. So, this device is classified as **Mobile Device**.



## 6. TEST RESULTS

### 6.1 ANTENNA GAIN

The maximum Gain measured in Fully Anechoic Chamber is 3dBi or 1.99526(numeric).

### 6.2 OUTPUT POWER INTO ANTENNA & RF EXPOSURE VALUE AT DISTANCE 20cm:

#### 802.11b DSSS MODULATION

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	POWER DENSITY (mW/cm <sup>2</sup> )	LIMIT OF POWER DENSITY (mW/cm <sup>2</sup> )
1	2412	64.714	18.11	0.026	1.000
6	2437	63.973	18.06	0.025	1.000
11	2462	64.269	18.08	0.026	1.000

#### 802.11g OFDM MODULATION

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	POWER DENSITY (mW/cm <sup>2</sup> )	LIMIT OF POWER DENSITY (mW/cm <sup>2</sup> )
1	2412	63.533	18.03	0.025	1.000
6	2437	64.269	18.08	0.026	1.000
11	2462	51.168	17.09	0.020	1.000



### DRAFT 802.11n (20MHz) OFDM MODULATION

CHAN.	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)			PEAK POWER OUTPUT (dBm)			TOTAL PEAK POWER (mW)	TOTAL PEAK POWER (dBm)	POWER DENSITY (mW/cm <sup>2</sup> )	LIMIT OF POWER DENSITY (mW/cm <sup>2</sup> )
		CHAIN0	CHAIN1	CHAIN2	CHAIN0	CHAIN1	CHAIN2				
1	2412	25.704	22.803	28.314	14.10	13.58	14.52	76.821	18.85	0.030	1.0
6	2437	22.387	25.645	25.235	13.50	14.09	14.02	73.267	18.65	0.029	1.0
11	2462	25.468	25.527	25.586	14.06	14.07	14.08	76.581	18.84	0.030	1.0

### DRAFT 802.11n (40MHz) OFDM MODULATION

CHAN.	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)			PEAK POWER OUTPUT (dBm)			TOTAL PEAK POWER (mW)	TOTAL PEAK POWER (dBm)	POWER DENSITY (mW/cm <sup>2</sup> )	LIMIT OF POWER DENSITY (mW/cm <sup>2</sup> )
		CHAIN0	CHAIN1	CHAIN2	CHAIN0	CHAIN1	CHAIN2				
1	2422	10.162	10.186	12.764	10.07	10.08	11.06	33.112	15.20	0.013	1.0
4	2437	11.246	12.735	12.882	10.51	11.05	11.10	36.863	15.67	0.015	1.0
7	2452	11.455	12.853	14.388	10.59	11.09	11.58	38.696	15.88	0.015	1.0